WHAT IS CLAIMED IS

1. A wafer processing apparatus for processing a wafer by dipping the wafer into a processing solution, comprising:

a processing bath having a depth that allows to completely dip the wafer into the processing solution;

wafer rotating means for rotating one or a plurality of wafers held by a wafer holder by using a wafer rotating member which rotates about a shaft shifted from a portion immediately below a barycenter of the one or plurality of wafers; and

ultrasonic generating means for generating ultrasonic waves in said processing bath.

2. The apparatus according to claim 1, wherein only said wafer rotating member is arranged as a member for transmitting a rotating force to the wafer below the one or plurality of wafers held by said wafer holder.

3. The apparatus according to claim 1, wherein said wafer rotating member comprises at least one rod member substantially parallel to said shaft, and said rod member rotates about said shaft.

4. The apparatus according to claim 3, wherein said rod member has a diameter much smaller than a diameter of a cylinder virtually formed upon rotation of said rod member about said shaft.

5. The apparatus according to claim 3, wherein said rod member has a groove which engages with a peripheral portion of the wafer.

6. The apparatus according to claim 5, wherein the groove has a V shape.

7. The apparatus according to claim 3, wherein a section of said rod member taken along said shaft has a substantially sine-wave shape.

8. The apparatus according to claim 3, wherein a section of said rod member taken along said shaft has a substantially full-wave rectifying shape.

9. The apparatus according to claim 1, wherein said wafer rotating means further comprises driving force generating means arranged outside said processing bath, and driving force transmission means for transmitting a driving force generated by said driving force generating means to said wafer rotating member and rotating said wafer rotating member.

10. The apparatus according to claim 9, further comprising a dividing member for dividing an interior of said processing bath into a processing wafer side and a side of said driving force transmission means.

11. The apparatus according to claim 9, wherein said driving force transmission means transmits the driving force generated by said driving force generating means

through a crank mechanism.

12. The apparatus according to claim 1, wherein said processing bath comprises a circulating mechanism having an overflow bath.

13. The apparatus according to claim 12, wherein said circulating mechanism comprises contamination reducing means for reducing contamination of the wafer by particles.

14. The apparatus according to claim 13, wherein said contamination reducing means comprises a filter.

15. The apparatus according to claim 13, wherein said contamination reducing means comprises means for adjusting flow of the processing solution in said processing bath.

16. The apparatus according to claim 1, wherein said ultrasonic generating means comprises an ultrasonic bath and an ultrasonic source, and said processing bath receives ultrasonic waves through an ultrasonic transmitting medium set in said ultrasonic bath.

17. The apparatus according to claim 1, further comprising driving means for changing a relative positional relationship between said ultrasonic source and a wafer to be processed.

18. The apparatus according to claim 17, wherein said driving means moves said ultrasonic source within said

ultrasonic bath.

19. The apparatus according to claim 1, wherein at least portions of constituent members of said processing bath and said wafer rotating means which may come into contact with the processing solution are made of one material selected from the group consisting of quartz and plastic.

20. The apparatus according to claim 1, wherein at least portions of constituent members of said processing bath and said wafer rotating means which may come into contact with the processing solution are made of one material selected from the group consisting of a fluorine resin, vinyl chloride, polyethylene, polypropylene, polybutyleneterephthalate (PBT), and polyetheretherketone (PEEK).

21. A wafer processing method of processing a wafer while ultrasonic waves are supplied, comprising:

processing the wafer while entirely dipping the wafer into a processing solution and rotating the wafer.

22. A wafer processing method of processing a wafer while ultrasonic waves are supplied, comprising:

processing the wafer while entirely dipping the wafer into a processing solution, and rotating and vertically moving the wafer.

23. A wafer processing method of processing a wafer

while ultrasonic waves are supplied, comprising:

processing the wafer while entirely dipping the wafer into a processing solution and changing a position of an ultrasonic source.

24. The method according to claim 21, wherein the wafer is cleaned using a wafer cleaning solution as the processing solution.

25. The method according to claim 21, wherein the wafer is etched using a wafer etching solution as the processing solution.

26. The method according to claim 21, wherein a porous silicon layer of a wafer having said porous silicon layer is etched using a porous silicon etching solution as the processing solution.

27. The method according to claim 21, wherein a porous silicon layer of a wafer having said porous silicon layer is etched using, as the processing solution, any one of

(a) hydrofluoric acid,

(b) solution mixture prepared by adding at least one of alcohol and hydrogen peroxide to hydrofluoric acid,

(c) buffered hydrofluoric acid,

(d) solution mixture prepared by adding at least one of alcohol and hydrogen peroxide to buffered

hydrofluoric acid, and

(e) solution mixture of hydrofluoric acid, nitric acid, and acetic acid.

28. A semiconductor substrate fabrication method, comprising:

the step of forming a non porous layer on a porous layer formed on a surface of a first substrate;

the step of bonding a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said non porous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the bonded structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing surface of the second substrate side,

the etching step rotating the second substrate side.

29. A semiconductor substrate fabrication method, comprising:

the step of forming a non porous layer on a porous layer formed on a surface of a first substrate;

the step of bonding a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said non porous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the bonded structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing surface of the second substrate side,

the etching step rotating and vertically moving the second substrate side.

30. A semiconductor substrate fabrication method, comprising:

the step of forming a non porous layer on a porous layer formed on a surface of a first substrate;

the step of bonding a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said non porous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the bonded structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing surface of the second substrate side,

the etching step changing a position of an ultrasonic source.

31. The method according to claim 28, wherein the etching solution used in the etching step is any one of

(a) hydrofluoric acid,

(b) solution mixture prepared by adding at least one of alcohol and hydrogen peroxide to hydrofluoric acid,

(c) buffered hydrofluoric acid,

(d) solution mixture prepared by adding at least one of alcohol and hydrogen peroxide to buffered hydrofluoric acid, and

(e) solution mixture of hydrofluoric acid, nitric acid, and acetic acid.

32. The method according to claim 28, wherein the removal step comprises exposing said porous layer by grinding, polishing, or etching said first substrate from a back surface.

33. The method according to claim 28, wherein the removal step comprises separating the first substrate

side and the second substrate side at a boundary of said porous layer.

~~34~~. The method according to claim ~~28~~, wherein said non porous layer is a single-crystal silicon layer.

~~35~~. The method according to claim ~~28~~, wherein said non porous layer is made up of a single-crystal silicon layer and a silicon oxide layer formed on said single-crystal silicon layer.

~~36~~. The method according to claim ~~28~~, wherein said non porous layer is a compound semiconductor layer.

~~37~~. The method according to claim ~~28~~, wherein said second substrate is a silicon substrate.

~~38~~. The method according to claim ~~28~~, wherein said second substrate is a silicon substrate having a silicon oxide film formed on a surface to be bonded to the first substrate side.

~~39~~. The method according to claim ~~28~~, wherein said second substrate is a light-transmitting substrate.